

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 6120

Tariff filing of Central Vermont Public Service)
Corporation requesting a 12.9% rate increase, to)
take effect July 27, 1998)

Docket No. 6460

In the Matter of Central Vermont Public Service)
Corporation requesting a 7.6% rate increase, to)
take effect December 24, 2000)

PREFILED SURREBUTTAL TESTIMONY OF
BRUCE EDWARD BIEWALD
ON BEHALF OF THE
VERMONT DEPARTMENT OF PUBLIC SERVICE

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April 20, 2001

Summary: Mr. Biewald's testimony responds to the rebuttal testimony of CVPS witnesses Deehan, Cater, and Amelang on used and useful policy issues, and their application to CVPS's purchase from Hydro Quebec, including projection of electricity market prices and the above market costs of the purchase.

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Prefiled Surrebuttal Testimony
of
Bruce Edward Biewald

1. Introduction and Summary

Q. Please state your name.

A. My name is Bruce Edward Biewald.

Q. Did you prepare direct testimony in this case?

A. Yes. My direct testimony was filed on March 9, 2001.

Q. What is the purpose of your surrebuttal testimony?

A. In this surrebuttal testimony I respond to the joint rebuttal testimony of CVPS witnesses Deehan, Cater, and Amelang dated March 30, 2001.

Q. Please summarize your findings.

A. Messrs. Deehan, Cater, and Amelang repeat rejected policy arguments, mischaracterize my direct testimony, and make many a variety of mistakes in their rebuttal testimony. Specifically:

- They argue that the Board's application of "used and useful" in ratemaking is inappropriate and unfair – but their policy arguments are almost entirely ones that the Board has considered and appropriately rejected in a series of

1 dockets dealing with these issues.

2 • They argue that my market price forecast should be adjusted upward by 7
3 percent to account for scheduling flexibility – but they do not understand
4 that my forecast already accounts fully for the contract’s scheduling
5 flexibility.

6 • They argue that a large credit for environmental benefits should be ascribed
7 to contract – but they look too narrowly at the range of impacts and
8 misapply air emission values from a Massachusetts docket.

9 • They argue that a large credit for risk reduction benefits should be ascribed
10 to the contract – but their analysis is limited to a flawed examination of price
11 volatility that ignores the tremendous risks of the contract associated with its
12 large size, with the fixed payments, and with the lack of flexibility.

13 Q. What do you conclude and recommend?

14 A. I conclude that the projections in my direct testimony of market prices and
15 above market costs of the purchase are a reasonable basis for ratemaking in this case,
16 and that the Board can disallow recovery of a portion of the HQ purchase costs
17 because they are not used and useful. Other Department witnesses present the

1 Department's position on what specifically the Board should do in this case.

2 **2. Used and Useful Policy Issues**

3 Q. In rebuttal testimony, CVPS witnesses Deehan, Cater, and Amelang put forward
4 several arguments against the application of "used and useful" policy in this case. Are
5 these new?

6 A. No. Deehan, Cater, and Amelang argue that used and useful policy should not
7 be applied in this case because: (1) only the "used" portion of the policy should be
8 applied; (2) it provides improper incentives to utilities; (3) it is unfair relative to GMP;
9 (4) it is unfair because it is not symmetrical; and (5) it is unfair because it is based upon
10 speculative forecasts. None of these arguments are reasonable, and none, except for
11 the comparison to GMP, are new. The Board has considered and rejected each of
12 these in prior cases.

13 Q. Please explain CVPS's notion that "used" is the appropriate standard for recovery of
14 costs in rates.

15 A. On page 8, in footnote 8, Deehan, Cater and Amelang state that "by
16 disallowing a utility's costs that arise in connection with resources that are actually
17 'used' to provide service to customers, the Board would exercise its jurisdiction to
18 supplant reasonable and justified utility rates with rate that are by definition
19 'insufficient.'" In effect, the Company position is that there should be no economic or

1 market standard for recovery of costs in regulated rates, and that if a resource was
2 prudently acquired and is “used” in providing service that it should be placed fully in
3 rates, regardless of how abysmal it is economically. This position would have
4 customers bear the full burden of economic losses, even for resources that lose
5 hundreds of millions of dollars.

6 Q. What is your view of this issue?

7 A. I believe that “used and useful” as applied by the Board in Vermont is the
8 appropriate way to treat the costs associated with uneconomic resources. The losses
9 should be shared between customers and shareholders. The Board has considered this
10 in a long series of cases, and has rejected CVPS’s limited concept of used and useful.
11 In its 1998 Order in Docket No. 5983, for example, the Board stated very plainly that:

12 Both parts of the standard must be satisfied in order for the
13 overall principle to be met. In this case, the evidence shows
14 that the contract is used. It is being dispatched to meet demand
15 for service. It is not, however, useful. Indeed, over its entire
16 remaining life under a wide range of possible scenarios, the
17 Contract is non-economic. The demand that the contract
18 serves could be more cost-effectively met by other resources
19 currently available in the market. Therefore, the contract is not
20 used and useful. (at 246)

21 The Board’s statements about the contract apply equally well in the present
22 case.

1 Q. Please explain CVPS's point that the application of used and useful will create improper
2 incentives.

3 A. Deehan, Cater, and Amelang state that the result of used and useful ratemaking
4 is that "utilities would be structurally discouraged from making investments that could
5 potentially fail a multi-year market test in hindsight." (at 12)

6 Q. What is your view of this issue of incentives?

7 A. It is difficult to design a system of regulation that provides a perfect set of
8 incentives for utility system planning and operation. Still, the Board's policy of sharing
9 the costs of uneconomic resources between customers and shareholders is a reasonable
10 one. If it is applied thoughtfully over time then there is no reason to think that the
11 incentives created are especially problematic. In any framework the regulated utility
12 must bear some responsibility for procuring a reasonable mix of resources over time. If
13 CVPS's implication is that given the Board's ratemaking policy that the Company will
14 exclusively consider only short-term resources, then it should be warned that such an
15 approach could be considered imprudent.

16 Q. Please explain CVPS's point that application of used and useful in this case would be
17 unfair.

18 A. The rebuttal testimony of Deehan, Cater, and Amelang, raises several
19 arguments about fairness. First, they believe that it would be unfair for the Board to

1 treat risk and environmental impacts as recommended in my direct testimony. I will
2 respond to those points about risk and the environment separately, in later sections of
3 this testimony.

4 In addition, Deehan, Cater, and Amelang raise the issue of fairness relative to
5 GMP. They observe that “Ultimately, in the Board’s order in Docket No. 5983, the
6 Green Mountain rate case, no disallowance was imposed on Green Mountain with
7 respect to Used and Usefulness” (at 89) and that “as a matter of fundamental equity
8 Central Vermont should receive no worse treatment because equitable administration of
9 public policy requires these parties be treated the same.” (at 89 and 90).

10 Q. Do you agree with CVPS on this point?

11 A. No. I believe that consistent principles should guide the Board in its decisions in
12 various cases that come before it. And those principles should be applied in consistent
13 ways. That does not mean that the procedures or the result will be identical in any two
14 cases. And it certainly does not mean that CVPS “should receive no worse treatment.”
15 It is also worth noting that in the GMP case the Board was presented with a settlement,
16 and that the settlement was a package with many elements. Application of consistent
17 ratemaking principles, including the Board’s used and useful policy, could very
18 reasonably produce a different result in this CVPS rate case.

1 Q. Please explain CVPS's argument that used and useful is unfair because it is not
2 symmetrical.

3 A. Deehan, Cater, and Amelang argue that used and useful is unfair to investors
4 because "it would impose speculative, estimated market-value losses without at least
5 the offsetting prospect of allowing Central Vermont to collect estimated, (equally)
6 speculative market-value excess profits." (at 77)

7 Q. Do you agree with this point?

8 A. No. I believe that the Board's application of used and useful is fair. Regulated
9 utilities are generally allowed a return on investment that is greater than risk free returns.
10 This "risk premium" compensates investors for occasional circumstances in which
11 investments fail economically. There is no need to provide some additional up side for
12 investors.

13 The Board has previously considered and ruled on this issue in several cases.

14 In its Order in Docket No. 5983, for example, the Board found that:

15 The return on equity that investors demand reflects the business
16 and market risks that the Company faces – among them, the
17 possibility that its contracts for services (for instance, labor,
18 billing and collection, and purchased power) may impose costs
19 upon it that may not be fully recoverable in the market price of
20 the goods it sells. This is true of any competitive business, and
21 it is this pressure upon firms that improves economic efficiency.
22 There is no compelling reason that utilities should be free of that

1 discipline. (at 247)

2 The Board's language addresses the application of used and useful to a
3 purchased power contract, and the reason that there is no need for a "symmetrical"
4 reward for a utility when its decisions result in costs below market prices. To provide
5 for this upside recovery of "market value excess profits," would grant an undeserved
6 windfall for utility investors.

7 Q. Please explain CVPS's point that it is unfair to take a used and useful approach in
8 ratemaking because it is speculative.

9 A. In rebuttal testimony, Deehan, Cater and Amelang state repeatedly that the
10 application of used and useful is based upon market price forecasts, and that these
11 forecasts are too uncertain and speculative to provide a sound basis for ratemaking.
12 They state that "Year after year forecasts of the evolving wholesale market tend to
13 fluctuate significantly as reality proves last year's long-term forecast irrelevant." (pfrt. at
14 9, lines 5 to 7)

15 Q. Do you agree with CVPS's argument regarding uncertainty and forecasts?

16 A. No, I do not agree, for several reasons. First, while forecasts do change over
17 time, and are subject to uncertainty, they are not wild speculation. The tools for
18 forecasting electricity prices are reasonably sophisticated and widely used. Utility
19 companies in Vermont and elsewhere routinely prepare market price forecasts to aid in

1 decision-making. Consultants, including LaCapra Associates who prepared analyses
2 for CVPS, apply models to forecast electricity prices, on behalf of utilities and others.
3 Utilities, government agencies, and consultants produce hundreds of electricity market
4 price forecasts every year, for purposes including ratemaking, stranded cost estimation,
5 taxation, asset transactions, planning, and policy development.

6 CVPS has asserted that “Unlike the way that a sale of an asset at least
7 establishes an objective measure of fair market value that can be directly compared to
8 its costs, this forecasting approach is just guesswork with the appearance of rigor.”
9 (Deehan, Cater, and Amelang, at 9 and 10) While an asset sale is one way to establish
10 a market value for the asset, there are other legitimate ways to value assets.

11 In fact, in asset sales, it is typical for buyers to base their offers upon exactly the
12 sort of market price forecasts that CVPS is so dissatisfied with. It is not a coincidence
13 that asset sales occur at prices resembling the discounted net revenue stream from their
14 operation, where those revenues are based upon standard market price forecasts.

15 While CVPS expresses reluctance in this case, for rates to be based upon
16 uncertain projections of market prices, CVPS has been willing to have stranded cost
17 recovery or exit fees imposed based upon projected market prices. In testimony in
18 New Hampshire Public Utility Commission Docket DR 97-241 witnesses Deehan and

1 Cater proposed ratemaking based upon a forecast of near-term market prices, that they
2 acknowledged was subject to uncertainty. (Cater direct testimony in DR 97-241 at 6
3 and 7).

4 It must also be pointed out that CVPS's characterization of forecasts as
5 "fluctuating significantly" each year making last year's forecast "irrelevant" is an
6 overstatement of the changes in forecasts over time. It is more accurate to say that
7 there are some fluctuations in near term prices, but that long-run forecasts tend to
8 change gradually over time. For example, my direct testimony in October 17, 1997 in
9 Docket No. 5983 included calculations of the losses associated with GMP's purchase
10 from HQ, based upon several forecasts that had been prepared in 1996. I deemed
11 those forecasts to be appropriate for use in October 1997, and the Board agreed,
12 basing its decision in that case upon those forecasts of market prices. The mid-range
13 forecast from that case has fared reasonably well over the last few years. My latest
14 forecast of market prices in direct testimony in this case is somewhat higher in the short
15 run, and lower in the long run, and on the whole would produce a similar estimate of
16 cumulative present value losses for CVPS's purchase from HQ.

17 Another reason that the Board should be comfortable relying upon forecasts is
18 that the methodologies and assumptions are subject to challenge in contested cases like
19 this one. Unreasonable methodologies and assumptions can be exposed as such, and

1 then corrected.

2 Finally, on this issue of ratemaking and forecast uncertainty, it should be pointed
3 out that the Board has known about uncertainty in forecasts for years, and has
4 nonetheless deemed it appropriate to base ratemaking decisions upon those forecasts
5 despite the uncertainty. Indeed, in its application of used and useful in Docket No.
6 5983, the Board selected two very different forecasts, one high and one low, and based
7 its ratemaking upon the midpoint between the two. (Order in 5983 at 254) The Board
8 understood and considered the uncertainty in forecasts, and reached a reasonable
9 ratemaking decision in the face of that uncertainty.

10 In conclusion, I believe that electricity price forecasts are subject to uncertainty,
11 but that even so, it is fair and appropriate to base ratemaking decisions upon those
12 forecasts.

13 Q. CVPS witnesses Deehan, Cater, and Amelang and criticize the portion of your direct
14 testimony on changes in the electric industry. What is your view of their argument?

15 A. Deehan, Cater, and Amelang devote several pages of rebuttal testimony to their
16 argument that my direct testimony on used and useful in the context of changes in the
17 electric industry is tautological and irrelevant (at 80, line 16 to 85, line 5).

1 I believe that when Deehan, Cater, and Amelang state that my analysis is
2 nothing more than a “tautology” (at 81, lines 18 and 19) they use the term to mean
3 redundant rather than logically all inclusive. My view on “used and useful” has been
4 consistent over many years, and I have presented it consistently in a series of regulatory
5 proceedings. I see no problem in that.

6 I believe that CVPS’s position that the changes in the industry have nothing to
7 do with the appropriate rate treatment for uneconomic resources (at 84 line 23 to 85,
8 line 5) fails to appreciate the degree of change in electricity markets, and its connection
9 to used and useful. While Vermont’s retail electricity prices remain regulated, the
10 wholesale markets and neighboring retail markets have undergone unprecedented
11 change. At the same time, technological developments making generation practical at
12 smaller scale has intensified competition at the end-use. Performance-based
13 approaches to regulation have been developed and have increasingly been applied to
14 electric utilities. Used and useful ratemaking is a natural aspect of regulation in this
15 increasing market-oriented environment. It would be blatantly inconsistent with market
16 principles and market realities to simply pass through all prudently incurred costs to
17 electricity consumers, regardless of how uneconomic the resource turns out to be.

18 Deehan, Cater, and Amelang see no distinction between nuclear plant
19 retirements in the region and the development of competitive markets, with respect to

1 the implications for used and useful ratemaking. (pfrt. at 85.) To me the difference is
2 obvious. The retirement of a nuclear power plant in the region has only an indirect
3 influence through the impact on market prices and thus on the value of remaining
4 resources. The development of competitive markets relates directly to used and useful
5 in several ways. First, with active competitive markets, the market values of resources
6 may be observed and projected with increased confidence. Second, with deregulation,
7 some utilities have found new and expanded business opportunities. Third, a key driver
8 of the introduction of competition in electricity is the intention to impose market
9 discipline upon uneconomic resource decisions.

10 All of this supports my conclusion that there have been changes in electricity
11 markets, as were anticipated by the Board in its Order in Docket Nos. 5701/5724
12 when it stated that "As utility markets become more open and competitive, it may
13 become increasingly possible and, in many cases, desirable to employ market-based
14 tests to govern the utility's total return." (at 127)

15 **3. Economics of CVPS's Purchase from HQ**

16 Q. You have discussed the issue of uncertainty in forecasts above, could you now
17 comment on the magnitude of the projected economic losses?

18 A. Yes. In my direct testimony I projected the economic losses of CVPS's HQ
19 purchase to be \$98 million in present value dollars over the period from 2001 to the end

1 of the contract (Biewald pft. at 4, line 6, and Exhibit DPS-BEB-4).

2 Beyond the general complaints about forecasts being subject to uncertainty,
3 CVPS's rebuttal testimony raises only three criticisms of my analysis. Witnesses
4 Deehan, Cater, and Amelang believe that the basic economic analysis should be
5 adjusted to account for (1) scheduling flexibility, (2) risk benefits, and (3) environmental
6 benefits. I disagree with CVPS on all three points. Before addressing each, however, it
7 should be noted that CVPS does not disagree with my fundamental conclusion that on a
8 direct cost basis, without adjusting for risk and environmental impacts, the purchase
9 from HQ is expected to be uneconomic through the end of the contract. In fact,
10 CVPS's projection of the direct economic losses (prior to their spurious risk and
11 environmental adjustments) puts the figure well above mine. Their projection is for
12 above market direct costs of \$153 million in present value dollars cumulative over the
13 period from 2001 to the end of the contract (Deehan, Cater, and Amelang pft. at 106,
14 line 3, and CVPS Exhibit Deehan/Cater/Amelang-13).

15 In Exhibit DPS-BEB-7, I summarize my projection of the long run above
16 market costs of the purchase along side of CVPS's two cases. From this table, it is
17 quite clear that the perspective of Deehan, Cater, and Amelang that the contract is
18 reasonable depends greatly on the claimed credits for risk reduction and environmental
19 benefits.

1 The figures listed in the Table for “above market direct costs” already account
2 for “scheduling flexibility” in the market price forecasts. This is true for both CVPS and
3 Synapse forecasts, so there is no need to break out the dollar impact in the table. Nor
4 is there a need to “adjust” the Synapse forecast for scheduling flexibility, since this
5 double count the effect, as I explain below. In the following sections of this testimony I
6 will discuss the adjustments for flexibility, environment, and risk.

7 **4. Scheduling Flexibility and the Purchase**

8 Q. Deehan, Cater, and Amelang argue that you erred by ignoring the scheduling flexibility
9 that CVPS has with the purchase from HQ. Please summarize their point.

10 A. Deehan, Cater, and Amelang argue that in comparing the HQ contract to
11 market prices it is appropriate to make an adjustment increasing market prices by 7
12 percent to account for the HQ contract’s “scheduling flexibility.” (at 100, line 11; and
13 103 line 12). They make this adjustment because they believe that “When Mr. Biewald
14 compares the HQ costs to market purchases, he does the comparison using average
15 annual prices that do not reflect the scheduling of HQ deliveries into relatively high
16 market prices hours.” (at 100, lines 4 to 6) They derive the 7 percent adjustment in
17 Exhibit Deehan/Cater/Amelang- 12, where they compare the weighted average price for
18 on-peak and off-peak deliveries under the contract (\$44.77/MWh) to the simple
19 average price in all hours (\$41.86/MWh). In effect, the finding is that because 62
20 percent of the HQ energy deliveries are during on-peak periods, the energy is worth 7

1 percent more than it would be if it were delivered at a de-rated capacity equally in all
2 hours of the year.

3 Q. Is this adjustment to market prices for scheduling flexibility appropriate?

4 A. No. I understand that the energy deliveries under the contract can be scheduled
5 and thus have value greater than a simple average “all-hours” market clearing price.
6 My projection of market prices in this case already recognizes this, and so no further
7 adjustment is necessary. Indeed, the adjustment that CVPS makes to my projection
8 inappropriately double counts this effect.

9 In my calculation of market prices for energy in 1999 and 2000, I relied upon
10 ISO-NE hourly energy market clearing prices, selecting the highest priced hours in each
11 month consistent with the purchase’s 70 percent capacity factor during that period. In
12 my application of NatSource futures market prices to the contract, for the years 2001,
13 2002, and 2003, I first assumed that the contract deliveries, now at a 75 percent
14 capacity factor, would be made as much as possible during on-peak periods, with only
15 the residual energy allocated to lower-priced off-peak periods. For the longer-term, in
16 which my market price forecast is based upon a combined-cycle plant as the market
17 entrant, I believe that a 75 percent capacity factor is a reasonable projected capacity
18 factor for such a plant, and so no adjustment to reflect *additional* scheduling flexibility
19 for the Hydro Quebec contract would be appropriate.

20 Q. Is your treatment of the contract deliveries in on-peak and off-peak periods consistent

1 with what was proposed by GMP and recently adopted by the Board in Docket No.
2 6107?

3 A. Yes, but the specific calculation works out a little differently. In GMP's recent
4 rate case, Docket No. 6107, GMP witness Dutton applied NatSource futures prices to
5 calculate the market value for GMP's purchase from Hydro Quebec in the years 2001
6 and 2002. Mr. Dutton's approach was to calculate a weighted average assuming that
7 2/3 of the deliveries are on-peak, and that 1/3 of the deliveries are off-peak. (Tr.
8 12/1/00 at 198-200) The Board found that for the long-term (2003 to 2015), the
9 Department's market price forecast was reasonable, but for the years, 2001 and 2002,
10 the Board concluded that Mr. Dutton's calculation for GMP based upon futures market
11 prices "appears to be a more accurate estimate" (Order in 6107, at 52). I agree with
12 GMP and the Board that futures market prices provide a reasonable basis for a near
13 term electricity price forecast, and I agree that it is reasonable to apply those prices to
14 the HQ contract deliveries in a way that recognizes that most of the deliveries are during
15 the on-peak period. In my analysis in this case, I did the market value calculation using
16 futures prices and recognizing that the contract deliveries can be scheduled to the
17 maximum extent possible into on-peak periods.

18 Q. Did you use the same 2/3 assumption that GMP proposed in Docket No. 6107 for
19 allocating the deliveries into on-peak periods?

20 A. No. I calculated that at most 63.5 percent of the deliveries could be during on-

1 peak periods. This is slightly lower than the 66.7 percent figure from Docket No.
2 6107.

3 I calculate the 63.5 percent maximum as follows. For a typical week with 168
4 hours, 80 of those hours are on-peak (16 hours for each of 5 week-days) and 88 of
5 those hours are off-peak. With the purchase from Hydro Quebec at 75 percent
6 capacity factor, that would represent 126 hours at full capacity ($168 \times 0.75 = 126$).
7 Putting the maximum 80 of the 126 hours into the on-peak period, leaves 46 hours of
8 deliveries that could not possibly occur during the on-peak period. So, by this
9 calculation, an appropriate ratio of on-peak to off-peak prices is 80 hours to 46 hours –
10 or 63.5 percent on-peak and 36.5 percent off-peak.

11 Q. How does your 63.5 percent figure compare with CVPS's numbers for actual contract
12 deliveries in on-peak time periods?

13 A. CVPS's data for July 2001 to June 2002 (in Exhibit Deehan/Cater/Amelang-
14 12) shows Hydro Quebec contract deliveries to CVPS at 61.64 percent on-peak and
15 38.36 percent off-peak.

16 **5. Environmental Impacts of the Purchase**

17 Q. CVPS witness Deehan, Cater, and Amelang express displeasure with your analysis of
18 environmental impacts of the purchase from Hydro Quebec. What is it that they

1 disagree with?

2 A. Their general complaint with my direct testimony on the environmental impacts
3 of the purchase is that they believe my testimony is based upon “contemplation” and
4 “speculation” and “almost no facts.” (Deehan, Cater, Amelang pft. at 21, line 16 to 22
5 line 18)

6 Q. Is that a fair assessment of your direct testimony on this subject?

7 A. Of course not. Any “impact” must be assessed relative to a counterfactual
8 reference. That is, the question of the size and type of an environmental impact for a
9 resource must be premised on an explicit or implicit answer to the question “What is the
10 alternative scenario against which impacts are to be identified and estimated?” My
11 direct testimony outlines the five possibilities that I believe deserve consideration in
12 examining the impacts of Vermont’s purchase from Hydro Quebec. (Biewald pft. at
13 17) The five cases pretty much exhaust the universe of possibilities – so by presenting
14 and discussing each of them, I believe that my testimony is quite logical and appropriate,
15 and helpful in understanding the issue in this case. Along the way, I present “facts”
16 including the type of impacts from large hydro (at 17, lines 10 to 16); the types of
17 generation that would be backed down in Ontario and New England (at 17, line 17 to
18 18 line 6); the position of GMP’s witness on this matter (at 18, lines 10 to 13); data on
19 the emissions rates and generation for Quebec’s Tracy oil-fired generating station (at
20 19, lines 1 to 19); and the resource mix and economics of dispatch in Quebec (at 20,

1 lines 1 to 9).

2 Q. Deehan, Cater, and Amelang point out in their rebuttal testimony that you do not
3 provide sufficient information to convince them that Tracy is a marginal generator on the
4 Quebec system. Please comment on this point.

5 A. In my direct testimony I provided information about the size, emissions, and
6 generation from Hydro Quebec's Tracy plant. Messrs. Deehan, Cater, and Amelang
7 find that this is insufficient to conclude that Tracy is the marginal source of generation on
8 the Hydro Quebec system. They say in rebuttal testimony that I present "absolutely no
9 information from HQ to confirm his [my] speculation." (pfrt. at 22, line 11). In
10 response to the Department of Public Service Data Request Number 24 in Set 18,
11 Deehan, Cater, and Amelang state that they "do not have information from Hydro
12 Quebec or from anyone else that either confirms or refutes what Mr. Biewald described
13 as a contemplation." They go on to state that "At a minimum, information which
14 matched output of the Tracy unit with hourly deliveries under the contract would be a
15 beginning point to understand whether or not the operations of the Tracy plant could
16 have anything to do with deliveries to Vermont under the contract." They sum up their
17 view of the situation saying that "The witnesses have no such information [on scheduling
18 Tracy vs. the VJO purchase], much the same as Mr. Biewald has no information. We
19 are all just whistling in the dark on the Tracy unit."

1 Messrs. Deehan, Cater, and Amelang take an unduly pessimistic view of what
2 can reasonably be concluded from limited data. We know that Tracy has been running
3 in recent years, and we know that the amounts of generation are comparable to Hydro
4 Quebec's energy sales to Vermont. We know that Hydro Quebec reports fossil fueled
5 generation on its system increasing from under 300 GWh per year in 1995 to 1997, to
6 1,775 GWh in 1998, and 1,246 GWh in 1999 (See Exhibit DPS-BEB-8). We know
7 that Hydro Quebec's system carbon dioxide emissions have increased, from under 200
8 thousand tonnes per year in 1995 to 1997, to 1,447 thousand tonnes in 1998, and 968
9 tonnes in 1999 (see Exhibit DPS-BEB-8). We know that Hydro Quebec's NO_x and
10 SO₂ emissions show similar trends (see Exhibit DPS-BEB-8). We know that the
11 Hydro Quebec system capacity mix is 93 percent hydro, and the remainder is nuclear,
12 oil, gas turbine, and diesel as indicated in Exhibit DPS-BEB-9. We know that an older
13 fossil fueled generators have a higher operating cost than existing hydro facilities. We
14 know that Hydro Quebec's system has considerable storage capability, not just daily or
15 weekly, but sufficient to carry substantial amounts of potential generation from one year
16 to the next. We know that the Tracy plant is located in the southern portion of the
17 Quebec system, close to loads and close to Vermont.

18 From these facts, I am quite confident concluding that if the energy deliveries to
19 Vermont or some similar buyer in the US or Canada did not occur, that the operation of
20 the Tracy plant would be decreased.

1 Q. Would a matching of hourly generation from Tracy to hourly deliveries under the
2 contract be interesting?

3 A. Such data might be interesting in some abstract sense. It would be irrelevant,
4 however, to the question of whether is the marginal source of generation on the Hydro
5 Quebec system since there is so much storage. On a system such as Quebec's, if the
6 oil generating station is operating a substantial amount of the time, then it can reasonably
7 be deemed that on an operational basis it is a marginal source of production supporting
8 incremental exports. The matching of the precise timing of that oil generation to the
9 timing of the exports is not important, because the system has sufficient storage
10 capability to easily shift energy from one hour to another.

11 Q. Do the emissions from the Tracy plant blow into Vermont?

12 A. It is reasonable to believe that they do. Tracy is located in the town of Tracy in
13 Quebec, approximately 40 miles northeast of Montreal. SO₂ and NO_x emissions from
14 power plants frequently travel hundreds of miles. While the prevailing winds in the area
15 are from the west, they occasionally blow to the southeast, and it is likely that some
16 portion of the SO₂ and NO_x emissions from Tracy directly affect air quality and
17 ecosystems in northeastern Vermont. The CO₂ emissions, of course, have a global
18 impact, regardless of the location of the source.

19 Similarly, some portion of the air emissions from power plants in Ontario, New

1 York, and other New England states can be expected to have an impact upon
2 Vermont. With prevailing winds from the west, however, emissions from power plants
3 in the eastern portion of New England (e.g., Maine, Eastern Massachusetts, and Rhode
4 Island) will tend to have a smaller direct impact upon Vermont.

5 Q. What is CVPS's position on the environmental impacts of the purchase from Hydro
6 Quebec?

7 A. CVPS's quantitative analysis includes enormous benefits for the purchase, but
8 the underlying "logic" is not clear. Deehan, Cater, and Amelang include only air
9 emissions in their analysis, and for the HQ purchase they include only CO₂ emissions, at
10 a rate of 0.21 lbs. per kWh, representing the emissions from flooding for new dams in
11 the James Bay region. For the alternative to the purchase CVPS assumes projected
12 New England system average air emission rates through 2005, and then switches to gas
13 combined cycle emission rates thereafter. (pfrt. at 29, to 31; and CVPS Exhibit
14 Deehan/Cater/Amelang-13) They apparently believe that the appropriate comparison
15 is between the environmental impacts of large hydro in Quebec relative to fossil
16 generation in New England. Within this framework, by including only the CO₂
17 emissions associated with hydro generation, CVPS ignores a host of impacts that are
18 essential to include in an economic evaluation of the environmental impacts of large
19 hydro. These include the flooding of land, the ecological impacts of flow modifications,
20 and cultural impacts.

1 Q. CVPS relies upon the “Mass Adders” from Massachusetts Department of Public
2 Utilities Dockets 89-239 and 91-131. Did the testimony in the Massachusetts dockets
3 or the Orders in those dockets saying anything about the environmental impacts of
4 hydro generation?

5 A. Yes. I was a witness on behalf of the Massachusetts Division of Energy
6 Resources in both of those dockets. In fact, the set of values for air emission that the
7 Massachusetts regulators adopted, and that CVPS uses in this case, were based upon
8 my testimony in those Massachusetts dockets. In Docket No. 89-239 my comments
9 (prepared with Rachel Shimshak, Harvey Salgo, and Donald Marron) stated that

10 Environmental scoring systems should be structured, to the
11 extent possible, so as to not have hidden biases for or against
12 specific resources; policy preferences among resources ought to
13 be explicitly reflected in the scoring system itself. Emphasis on
14 fossil-plant emissions, for example, may cause a ranking system
15 to favor non-fossil systems – not only demand-side
16 management, but also hydro power and nuclear power, among
17 others. The latter have significant environmental impacts that
18 are not primarily fossil related. If a scoring system ignores the
19 primary impacts of a specific resource, that resource will be
20 favored at the expense of other resources. (page 25,
21 “Comments of the Division of Energy Resources,” February
22 23, 1990)

23 In its order in that case, the DPU adopted the proposed monetary values for air
24 emissions, but recognized the problems with an incomplete approach:

25 All externality evaluations submitted to the Department in

1 D.P.U. 89-239 omit environmental externalities associated with
2 nuclear and renewable (most notably large hydro and waste-to-
3 energy projects) energy production, and with load management
4 programs. The Department directs each electric company to
5 propose environmental externality values associated with
6 nuclear and renewable energy production, and load-
7 management projects, and to include such values in its first
8 Phase I filing pursuant to the attached regulations. (page 59,
9 D.P.U. 89-239, August 31, 1990)

10 The Massachusetts regulators who adopted the dollar values for air emissions
11 were faced with resource options that included proposed fossil fueled generation and
12 demand-side management, and this influenced their priorities. They were not faced with
13 a hydro option. Surely this influenced their decision to defer consideration of non-air
14 externalities. By applying the values for air emissions from the Massachusetts regulatory
15 decision CVPS has produced a biased and misleading analysis.

16 Q. What if CVPS is basing its analysis of environmental impacts not on cause and effect,
17 but on the basis that because the money is paid to Hydro Quebec then it is appropriate
18 to use hydro plant externalities?

19 A. If this is the basis for CVPS's position, then it is problematic. Deehan, Cater,
20 and Amelang state that:

21 With regard to environmental benefits, Mr. Biewald basically
22 argues that we should ignore the environmental benefits
23 attendant with the HQ contract because if the VJO didn't buy
24 the power from HQ, someone else would. The Board should
25 not allow itself to become engaged in an endless process of

1 speculation and conjecture regarding all the possible moves and
2 counter moves of other market participants every time a
3 Vermont utility seeks recovery of the cost of purchased power
4 or makes a resource acquisition. The best the Company can do
5 is to, in part, choose resource based upon their environmental
6 characteristics. If we want a clean resource mix, we should buy
7 clean resources, then those incentives must be realized in the
8 rate making process. Mr. Biewald's recommendation may be
9 an effective way to damage the Company, but it is not a good
10 way to steer planners toward environmentally benign
11 resources." (pfrt. at 99)

12 From this it does appear that CVPS takes the fatalistic position that in procuring
13 resources one cannot hope to understand the actual impacts of one's choice, and so
14 must just look at where the money goes and feel satisfied if it goes to a Company which
15 owns a renewable or environmentally benign resource. This is entirely inadequate. I
16 hope that it is not "the best the Company can do." It is an approach to resource
17 procurement that is likely to result in paying excessive prices for resources with no real
18 environmental benefit.

19 Nonetheless, this idea of buying satisfaction rather than results has some
20 currency with the emerging green power markets, private certification efforts, and
21 renewable portfolio standards. Even so, placing the HQ purchase into a framework
22 where "allocation" matters rather than results does not work, for the simple reason that
23 large Hydro generation is not considered environmentally benign by consumers or by
24 their representatives.

1 Q. What do consumers and their representatives indicate with regard to the environmental
2 desirability of large hydro projects?

3 A. Consumers and their representatives generally seem to believe that large hydro
4 as an electricity source is not environmentally desirable. Based upon activity in New
5 England on green power certification and related regulatory efforts it is reasonable to
6 conclude that it will not be possible to effectively market Hydro Quebec power in this
7 region as an “environmentally benign resource” (the phrase is from pfrt. of Deehan,
8 Cater, and Amelang, at 99).

9 The leading effort in certification of such products in New England is the
10 “Green-e” program, administered by the Center for Resource Solutions. Large scale
11 hydropower does not qualify for certification. CRS’s September 22, 1999,
12 “Accreditation of Green Pricing Programs Final Criteria” identifies a threshold of 30
13 MW, above which hydroelectric projects would not be eligible.

14 In the future, CRS may allow some hydro generation larger than 30 MW to
15 qualify for Green-e certification, but in order to qualify for certification the facilities will
16 likely have to meet the “Low Impact Hydro Guidelines.” These guidelines, produced
17 by the Low Impact Hydropower Institute drawing upon input from a broad group of
18 organizations, establish “certification criteria that hydropower facilities must meet in the
19 following eight areas: (1) river flows, (2) water quality, (3) fish passage and protection,

1 (4) watershed protection, (5) threatened and endangered species protection, (6) cultural
2 resource protection, (7) recreation, and (8) facilities recommended for removal.” (Low
3 Impact Hydropower Certification Program, Part VI, Certification Criteria, Draft – July
4 23, 1999, page 1).

5 Q. How is hydro generation treated in state renewable portfolio standards in New
6 England?

7 A. Four New England states have adopted Renewable Portfolio Standards,
8 requiring that retail suppliers provide a specified fraction of their electricity from
9 renewable generation. For these programs, Quebec’s large hydro typically would not
10 qualify. The four New England states with renewable portfolio standards are
11 Connecticut, Massachusetts, Maine, and Rhode Island. In Connecticut, the RPS has
12 two classes of renewables. Hydro generation is excluded from class I. Connecticut’s
13 Class II renewables, may include hydro facilities, provided that they have an
14 appropriate FERC license.

15 In Massachusetts’s RPS, hydro generation may be included, but the language
16 used is “naturally flowing” hydroelectric. There has been considerable controversy in
17 the group attempting to implement the Massachusetts RPS, about several issues
18 including this one, and at present the plan is to provide for only new renewable
19 generation in the RPS. This approach avoids the issue of deciding what hydro is

1 “naturally flowing.” In my view it would be a tremendous stretch of the term to interpret
2 it to include large hydro projects in Quebec.

3 In Maine’s RPS renewable resources can include hydro, but there is a general
4 size limit of 100 MW. Generating facilities larger than 100 MW would not qualify.

5 In Rhode Island’s RPS there is no general size cut off, but there is a threshold of
6 80 MW specifically for hydro generation.

7 Q. What do you conclude with respect to the purchase from Hydro Quebec in the context
8 of these green electricity product markets and renewable portfolio standards?

9 A. I conclude that there is a widespread view, if not a consensus, that even though
10 generation from large hydropower projects may be “renewable,” that it is not
11 environmentally benign, or even environmentally preferable to system power. It is not
12 reasonable to ascribe environmental benefits to the purchase from Hydro Quebec.

13 The Board’s previous orders (including its decision in Docket No. 6107) have
14 found that some adjustment for environmental benefits favorable to the purchase is
15 appropriate. I do not agree with this. I recommend that the Board find that no
16 adjustment for environmental benefits be made in computing the economic losses for the
17 purchase, and in applying used and useful ratemaking. If the Board does decide to

1 make an adjustment, then it certainly should not make the erroneous adjustment that
2 CVPS's witnesses recommend in this case.

3 **6. Risk Implications of the Purchase**

4 Q. Witnesses Deehan, Cater, and Amelang argue in rebuttal testimony that there are
5 substantial risk related benefits of the purchase from Hydro Quebec. Do they address
6 your direct testimony in that rebuttal?

7 A. No. Deehan, Cater, and Amelang do not address my direct testimony in a
8 substantive way. They state that Biewald "makes sketchy reference to, but provides
9 little substantive explanation of, the implications of some 'option value' studies" and
10 decide that "[i]t is difficult to respond to Mr. Biewald's second point because he
11 provides little explanation and no analysis" so they move on to address a different point
12 and to present their own risk analysis (at 27).

13 Q. Is it likely that Deehan, Cater, and Amelang could not understand your direct testimony
14 with respect to option value?

15 A. I suppose that it is possible, but it is not likely. In direct testimony I explained
16 what I meant by option value (at 20, line 11 to 21, line 16). I provided more than a
17 page discussing "option value" but really it is a straightforward concept that can be
18 summarized in a simple statement: Actions that diminish flexibility can have an economic

1 cost.

2 I would expect that individuals with years of experience planning electric power
3 systems who are capable of preparing an analysis of “counter-cyclical price stability”
4 using the “Black-Scholes option pricing model” and the “capital asset pricing model”
5 (at 39, line 4, and CVPS Exhibit Deehan, Cater, and Amelang-7) would be able to
6 figure out what “option value” means, and to incorporate it into planning decisions.

7 In the Docket No. 6018, a CVPS rate case in 1998, I provided eleven papers
8 on option value in response to Question 11 of CVPS’s Tenth Set of Information
9 Requests. I have listed those papers in Exhibit DPS-BEB-10. I would be happy to
10 provide additional copies.

11 Q. Are techniques for analysis of “option value” widely taught in courses on planning?

12 A. Yes. My understanding is that “option” analysis is widely understood by
13 planners and decision markets, at least at a conceptual level. It is routinely taught in
14 basic courses on policy analysis. For example, Stokey and Zeckhauser’s book “A
15 Primer for Policy Analysis” has a full chapter on “decision analysis” which explains how
16 to recognize option value in decision making.

17 Q. Have utilities applied these “option value” techniques to resource planning?

1 A. Yes. Mass Electric Company has applied option value techniques in its
2 planning analyses. For example, in its “PLAN 94” Mass Electric stated that “The
3 Company has adopted option theory as a primary tool with which to address the
4 uncertainties facing the electric utility industry.” (at 1) The motivation was, at least in
5 part, to “optimize today’s decisions in light of the uncertainties about tomorrow by
6 quantifying the value of risk-management tactics such as shorter project leadtimes,
7 flexibility in contractual commitments, and waiting for future information such as evolving
8 environmental regulations.”

9 In is interesting that in its description of “Option Theory” Mass Electric
10 observed that

11 Changes in the utility environment such as evolving competition
12 and incentive-based rate making suggest that risks will be
13 increasingly transferred to the utility shareholder. Heightened
14 competitiveness in the wholesale power market, the increase in
15 customer cogeneration, and the possibility of retail wheeling are
16 indicators of a future in which the value of an investment
17 opportunity will depend less on how that investment is
18 perceived by the regulators and more on how it is perceived by
19 the market.

20 Mass Electric goes on to apply the technique in several case studies of
21 decision-making. In one example, they analyze a potential repowering project at the
22 Vernon Hydroelectric plant, and conclude that the project “is economic...but should be
23 deferred until future capacity and energy values are more certain.” Mass Electric also

1 applies decision tree analysis to a decision about whether and when to retire its Salem
2 generating units.

3 Q. Is the sort of option value that you, and Mass Electric, discuss the same as the value of
4 financial options?

5 A. No. The concepts are related, but different. In the case of option value reflected in
6 system planning, the concept refers to the value of making decisions at different points in
7 time, reflecting the value of information and flexibility. Financial options are the right to
8 buy or sell something at a particular price at a future date. That right can have some
9 value, and may be traded in a market.

10 Q. Is it your testimony that the pricing structure of the Hydro Quebec purchase is as
11 volatile as fossil fuel prices or market prices for electricity?

12 A. No. I agree with Deehan, Cater, and Amelang that there can be some “risk
13 reduction” benefit associated with a resource that has a fixed price stream – particularly
14 in the context of a portfolio of resources with other risk characteristics. CVPS raises
15 some legitimate points about one aspect of resource risk (volatility). The price for the
16 purchase is partially fixed, and partially indexed to general price inflation. It is,
17 therefore, largely independent of fossil fuel price fluctuations (although inflation may tend
18 to be correlated with fuel price spikes). Depending upon a Company’s resource
19 portfolio, a contract like this can have some risk reduction value.

1 CVPS points to the price fluctuation aspect of risk in rebuttal testimony. In my
2 direct testimony, and here in my surrebuttal testimony, I simply attempt to complete the
3 consideration of risk by pointing out that there are aspects of risk that cut the other way.
4 Specifically in the case of CVPS's purchase from Hydro Quebec, there are risks
5 associated with its large size, with the fixed payments, and with the lack of flexibility.
6 The commitment to purchase had a cost in terms of lost "option value" or increased
7 exposure to risk.

8 Q. Is it your testimony that CVPS's analysis of the volatility aspect of risk is reasonable?

9 A. Absolutely not. The value of a large and (mostly) fixed price resource will
10 depend upon the rest of the Company's resource portfolio. Since CVPS does not have
11 much fossil energy in its mix, the Hydro Quebec contract does not provide
12 diversification or risk-reduction the way that it would for heavily oil-dependent utilities,
13 such as Boston Edison or Northeast Utilities prior to divestiture.

14 The analysis of risk that Deehan, Cater, and Amelang present in rebuttal
15 testimony is inappropriate and misleading. They motivate their analysis by stating that
16 Mr. Chernick and I "have estimated potential losses associated with the contract but ...
17 have made no attempt to estimate potential gains." (Exhibit Deehan/Cater/Amelang at
18 2) This is simply not correct. My analysis is of actual and expected losses. By
19 pretending that the purchase is an option that CVPS can decide to take or not on an

1 annual basis, Messrs. Deehan, Cater, and Amelang have devised a way to arrive at a
2 number, but that number has little or nothing to do with the actual contract which is a
3 take-or-pay arrangement, not an option.

4 Mr. Chernick's surrebuttal testimony addresses specific problems with CVPS's
5 options analysis.

6 Q. What do you conclude with regard to the risk attributes of the purchase from Hydro
7 Quebec?

8 A. I conclude that the Board was correct in its Order in Docket No. 6107 where
9 it declined to apply a risk adjustment credit to the Hydro Quebec contract. (at 46)

10 Q. Does this conclude your testimony?

11 A. Yes.
